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EXAMINER	
TRIEU, THAI BA	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/594,580
Filing Date: September 27, 2006
Appellant(s): KOGO, TOMOYUKI

Patrick T. Muffo
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on 02/11/2011 appealing from the Office action mailed on 07/13/2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1-9 are cancelled; and

Claims 10-18 are rejected and are under appeal.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

In view of Appellant's arguments in Appeal Brief filed on February 11, 2011, the rejections of claims 10-18 under 35 U.S.C. § 112, second paragraph, are now withdrawn.

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

JP-2003-206722 A	SAITO et al.	7-2003
JP-2003-278536 A	KOBAYASHI et al.	10-2003

JP-2002-070536 A	NAGAE	03-2002
JP-2003-120353 A	KAWAMOTO	04-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 10-12, 14-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito Shinichi et al. (Pub. Number JP 2003-206722 A).

Regarding claims 10-12 and 14-16, Saito Shinichi discloses an exhaust gas control apparatus for an internal combustion engine/ an exhaust gas control method for an internal combustion engine (11), comprising:

a catalyst (22) which is provided in an exhaust passage of an internal combustion engine (11) and which has an oxidizing ability (See Figure 1);

a supercharger (18) which includes a turbine (20) that is rotated by exhaust gas, and a compressor (19) that is rotated in accordance with rotation of the turbine (20) and that performs supercharging;

a turbine rotation controller (24) that adjusts an amount of energy of the exhaust gas, which is used for rotating the turbine (19); and

an injection controller (Not shown, See Paragraph [0013]) that performs after-injection for injecting fuel after main fuel injection in order to increase a temperature of the exhaust gas released from the internal combustion engine (11) and flowing in the catalyst (22),

wherein when a work amount of the compressor (19) is increased due to the after-injection performed by the injection controller (Not shown- See Paragraph [0013]), the turbine rotation controller (24) decreases the amount of energy taken from the exhaust gas for rotating the turbine (20) in order to decrease the increase in the work amount due to the after injection to zero (See Figure 1, Claim 4, and Paragraphs [0029], [0031], [0043], [0044], [0046] and [0048]);

(Re. Cls. 11 and 15) wherein the turbine rotation controller (24) decreases the amount of energy of the exhaust gas, which is used for rotating the turbine (20), by increasing an opening amount of a variable nozzle provided in the supercharger and/or an opening amount of a wastegate valve (24) (See Figure 1);

(Re. Cl. 12) wherein the injection controller (Not Shown, See Paragraph [0013]) decides an amount of fuel injected by the after-injection based on a temperature at which the catalyst is activated, and wherein the turbine rotation, controller increases the opening amount of the variable nozzle provided in the supercharger and/or the opening amount of the wastegate valve (24) as the amount of fuel injected by the after-injection increases (See Paragraphs [0008]-[0009]).

However, Saito Shinichi fails to disclose the position of the turbine being provided in the exhaust passage at a position upstream of the catalyst having an oxidizing ability, or the position of the catalyst having an oxidizing ability and being provided in the exhaust passage at a position downstream of the turbine.

The reference to Saito Shinichi fails to specifically disclose an oxidizing catalyst; however, it does note that the soot particles are oxidizing in the PDF (See Paragraph [0028]). Thus, one having ordinary skill in the art would have found it is obvious to position an oxidizing catalyst downstream of the turbine of the turbocharger if conditions are required such as not all the particulate matter being oxidized in the PDF.

Regarding claim 18, Saito Shinichi discloses an exhaust gas control apparatus for an internal combustion engine, comprising:

a catalyst (22) which is provided in an exhaust passage of an internal combustion engine (11) and which has an oxidizing ability;

a supercharger (18) which includes a turbine (19) that is rotated by exhaust gas, and a compressor (20) that is rotated in accordance with rotation of the turbine and that performs supercharging;

turbine rotation energy amount adjusting means (24) for adjusting an amount of energy of the exhaust gas, which is used for rotating the turbine; and

after-injection performing means (Not shown, See Paragraph [0013]) for performing after-injection for injecting fuel after main fuel injection in order to increase a temperature of the exhaust gas released from the internal combustion engine and flowing in the catalyst, wherein when a work amount of the compressor is increased due to the after-injection performed by the after- injection performing means, the turbine rotation energy amount adjusting means (24) decreases the amount of energy taken from the exhaust gas for rotating the turbine in order to decrease the increase in the

work amount due to the after injection to zero (See Figure 1, Claim 4, and Paragraphs [0029], [0031], [0043], [0044], [0046] and [0048]).

However, Saito Shinichi fails to disclose the position of the turbine being provided in the exhaust passage at a position upstream of the catalyst having an oxidizing ability, or the position of the catalyst having an oxidizing ability and being provided in the exhaust passage at a position downstream of the turbine.

The reference to Saito Shinichi fails to specifically disclose an oxidizing catalyst; however it does not disclose that the soot particles are oxidizing in the PDF (See Paragraph [0028]). Thus, one having ordinary skill in the art would have found it is obvious to position an oxidizing catalyst downstream of the turbine of the turbocharger if conditions are required such as not all the particulate matter being oxidizing in the PDF.

Claims 10-12, 14-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito Shinichi et al. (Pub. Number JP 2003-206722 A), in view of either Kobayashi Masaaki et al. (Pub. Number JP 2003-278536 A) or Nagae Masahiro (Pub. Number JP 2002-070536 A).

Regarding claims 10-12 and 14-16, Saito Shinichi discloses an exhaust gas control apparatus for an internal combustion engine/ an exhaust gas control method for an internal combustion engine (11), comprising:

a catalyst (21) which is provided in an exhaust passage of an internal combustion engine (11) (See Figure 1);

a supercharger (18) which includes a turbine (20) that is rotated by exhaust gas, and a compressor (19) that is rotated in accordance with rotation of the turbine (20) and that performs supercharging;

a turbine rotation controller (24) that adjusts an amount of energy of the exhaust gas, which is used for rotating the turbine (19); and

an injection controller (Not shown, See Paragraph [0013]) that performs after-injection for injecting fuel after main fuel injection in order to increase a temperature of the exhaust gas released from the internal combustion engine (11) and flowing in the catalyst (22),

wherein when a work amount of the compressor (19) is increased due to the after-injection performed by the injection controller (Not shown, See Paragraph [0013]), the turbine rotation controller (24) decreases the amount of energy taken from the exhaust gas for rotating the turbine (20) in order to decrease the increase in the work amount due to the after injection to zero (See Figure 1, Claim 4, and Paragraphs [0029], [0031], [0043], [0044], [0046] and [0048]);

(Re. Cls. 11 and 15) wherein the turbine rotation controller (24) decreases the amount of energy of the exhaust gas, which is used for rotating the turbine (20), by increasing an opening amount of a variable nozzle provided in the supercharger and/or an opening amount of a wastegate valve (24) (See Figure 1);

(Re. Cl. 12) wherein the injection controller (Not Shown, See Paragraph [0013]) decides an amount of fuel injected by the after-injection based on a

temperature at which the catalyst is activated, and wherein the turbine rotation, controller increases the opening amount of the variable nozzle provided in the supercharger and/or the opening amount of the wastegate valve (24) as the amount of fuel injected by the after-injection increases (See Paragraphs [0008]-[0009]).

However, Saito Shinichi fails to disclose the catalyst having an oxidizing ability.

Kobayashi Masaaki/Nagae Masahiro teaches that it is conventional in the art of controlling exhaust emissions for turbocharged internal combustion engines, to utilize the catalyst having an oxidizing ability (20 of Kobayashi Masaaki; 22 of Nagae Masahiro) (See Figure 1 and Paragraphs [0058], [0071] of Kobayashi Masaaki; Figure 1, Abstract , Paragraph [0020] of Nagae Masahiro).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the catalyst having an oxidizing ability, as taught by Kobayashi Masaaki/Nagae Masahiro, to oxidize the harmful gases prior to release to the atmosphere.

Alternatively, the substitution of the catalyst having an oxidizing ability (20/22) as shown in Kobayashi Masaaki/Nagae Masahiro for a Diesel particulate filter (DPF) (21) would have been obvious to one of ordinary skill in the art at the time of the invention since the substitution of the catalyst having an oxidizing ability (20/22) would have yielded predictable results, namely, to oxidize the harmful gases prior to release to the atmosphere. *KSR Int'l Co.* v. *Teleflex Inc.,* 82 USPQ2d 1395 (U.S. 2007).

Regarding claim 18, Saito Shinichi discloses an exhaust gas control apparatus for an internal combustion engine, comprising:

a catalyst (21) which is provided in an exhaust passage of an internal combustion engine (11);

a supercharger (18) which includes a turbine (19) that is rotated by exhaust gas, and a compressor (20) that is rotated in accordance with rotation of the turbine and that performs supercharging;

turbine rotation energy amount adjusting means (24) for adjusting an amount of energy of the exhaust gas, which is used for rotating the turbine; and

after-injection performing means (Not shown, See Paragraph [0013]) for performing after-injection for injecting fuel after main fuel injection in order to increase a temperature of the exhaust gas released from the internal combustion engine and flowing in the catalyst, wherein when a work amount of the compressor is increased due to the after-injection performed by the after-injection performing means (Not shown, See Paragraph [0013]), the turbine rotation energy amount adjusting means (24) decreases the amount of energy taken from the exhaust gas for rotating the turbine in order to decrease the increase in the work amount due to the after injection to zero (See Figure 1, Claim 4, and Paragraphs [0029], [0031], [0043], [0044], [0046] and [0048]).

However, Saito Shinichi fails to disclose the catalyst having an oxidizing ability.

Kobayashi Masaaki/Nagae Masahiro teaches that it is conventional in the art of controlling exhaust emissions for turbocharged internal combustion engines, to utilize the catalyst having an oxidizing ability (20 of Kobayashi Masaaki; 22 of Nagae

Masahiro) (See Figure 1 and Paragraphs [0058], [0071] of Kobayashi Masaaki; Figure 1, Abstract , Paragraph [0020] of Nagae Masahiro).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the catalyst having an oxidizing ability, as taught by Kobayashi Masaaki/Nagae Masahiro, to oxidize the harmful gases prior to release to the atmosphere.

Alternatively, the substitution of the catalyst having an oxidizing ability (20/22) as shown in Kobayashi Masaaki/Nagae Masahiro for a Diesel particulate filter (DPF) (21) would have been obvious to one of ordinary skill in the art at the time of the invention since the substitution of the catalyst having an oxidizing ability (20/22) would have yielded predictable results, namely, to oxidize the harmful gases prior to release to the atmosphere. *KSR Int'l Co.* v. *Teleflex Inc.,* 82 USPQ2d 1395 (U.S. 2007).

Claims 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito Shinichi et al. (Pub. Number JP 2003-206722 A), in view of either Kobayashi Masaaki et al. (Pub. Number JP 2003-278536 A) or Nagae Masahiro (Pub. Number JP 2002-070536 A); and further in view of Kawamoto Keiji (Pub. Number JP 2003-120353 A).

The modified Saito Shinichi device discloses the invention as recited above; however, fails to disclose at least one of intake air amount detector that detects an amount of intake air flowing through an intake passage of the internal combustion

engine and intake air pressure detector that detects a pressure of the intake air is further provided in the intake passage of the internal combustion engine.

Kawamoto Keiji teaches that it is conventional in the art of controlling exhaust emissions for turbocharged internal combustion engines, to utilize at least one of intake air amount detector that detects an amount of intake air flowing through an intake passage of the internal combustion engine and intake air pressure detector (9) that detects a pressure of the intake air is further provided in the intake passage of the internal combustion engine (See Figure 1, Paragraphs [0021] and [0023]), and

wherein the turbine rotation controller (18) decreases the amount of energy of the exhaust gas, which is used for rotating the turbine, when a value detected by the intake air amount detector or the intake air pressure detector (via 9) after the after-injection is performed is higher than a value detected by the intake air amount detector or the intake air pressure detector before the after-injection is performed (See Figure 1, Abstract and Paragraph [0030]).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized at least one of intake air amount detector that detects an amount of intake air flowing through an intake passage of the internal combustion engine and intake air pressure detector that detects a pressure of the intake air is further provided in the intake passage of the internal combustion engine, as taught by Kawamoto Keiji, to improve the performance efficiency of the exhaust gas purification for the modified Saito Shinichi device, since the use thereof would have improved the responsiveness of the turbocharging/supercharging pressure rise.

(10) Response to Argument

1 . Rejection under 112 , second paragraph:

In view of appellant's arguments in Appeal Brief filed on February 11, 2011, the rejections of claims 10-18 under 35 U.S.C. § 112, second paragraph, are now withdrawn.

2. Rejections under 35 U.S.C. 103(a):

a. Rejection of claims 10, 14 and 18 under 35 U.S.C. §103(a) over Saito et al., JP-A-2003-206722

In response to appellant’s arguments on pages 12-15, appellant asserts that Saito fails to disclose all of the features of claims 10, 14 and 18 and has failed to provide a factual basis why one of ordinary skill in the art allegedly would have rearranged the components of Saito, claims 10, 14 and 18 would not have been obvious in view of Saito.

Appellant argues that Saito fails to disclose and would not rendered obvious the limitations of “wherein when a work amount of the compressor is increased due to the after-injection performed by the injection controller, the turbine rotation controller decreases the amount of energy taken from the exhaust gas for rotating the turbine in order to decrease the increase in work amount due to the after injection to zero”.

Appellant also asserts that independent claims 10, 14, and 18 maintain the work amount of the compressor, i.e. “decrease the increase

in the work amount due to the after injection to zero", while the post-injection process of Saito increases the work amount of the compressor

The examiner respectfully disagrees since the obviousness over Saito does provide a factual basis of reducing exhaust emissions with rearranging the components of Saito.

Emphatically, the catalyst having oxidizing ability and being rearranged at downstream of the turbine does not effect on the operation of the whole engine system and still performs its function of reducing exhaust emissions.

Additionally, Saito, in Figure 1, Claim 4, and paragraphs [0029], [0031], [0043], [0046] and [0048] does disclose the limitation of "wherein when a work amount of the compressor is increased due to the after-injection performed by the injection controller, the turbine rotation controller decreases the amount of energy taken from the exhaust gas for rotating the turbine in order to decrease the increase in work amount due to the after injection to zero", as being claimed in Claims 10, 14, and 18. Specifically, paragraph [0046] of Saito discloses the post-injection increases the work amount of the compressor as the waste gate valve is closed and the work amount of the compressor is increased; and Paragraph [0048] of Saito also shows that as the waste gate valve is

opened, neither the work amount of the turbine nor the work amount of the compressor is increased.

[0046] With the exhaust purification device for an internal combustion engine of the invention of Claim 2, the turbo supercharger is constituted by a waste valve that causes the exhaust gas upstream of the turbine in the exhaust system to bypass down to downstream of the turbine or a boost pressure adjusting mechanism whereby boost pressure can be variably controlled, and the controlling means either closes the waste gate valve or controls the boost pressure adjusting mechanism such that the boost pressure rises when the reducing agent is applied to the catalyst, and therefore by supplying reducing agent to the catalyst after [the internal combustion engine] enters the specific operating state after the particulate matter accumulated on the filter has ignited, the temperature of the exhaust gas at the turbine inlet rises and ***either the waste gate valve is closed or the boost pressure is caused to rise, thereby effectively increasing turbine work and raising the boost pressure because the hot exhaust gas is no longer bypassed down to downstream of the turbine via the waste gate valve or the boost pressure adjusting mechanism.*** In other words, the amount of air taken into the internal combustion engine increases, thereby causing the exhaust gas flow rate to increase, and even if sudden combustion of the particulate matter accumulated on the filter occurs, the produced heat is carried away by the exhaust gas, making it possible to prevent overheating of the filter in advance.

[0048] With the exhaust purification device for an internal combustion engine of the invention of Claim 4, an accumulated amount estimating means for estimating an accumulated amount of particulate matter collected on the filter is provided, the turbo supercharger is constituted by a waste valve that causes the exhaust gas upstream of the turbine in the exhaust system to bypass down to downstream of the turbine or a boost pressure adjusting mechanism, and the controlling means supplies reducing agent to the catalyst and either opens the waste gate valve or controls the boost pressure adjusting mechanism ***such that the boost pressure falls*** when an accumulated amount of particulate matter estimated by the accumulated amount estimating means exceeds a predetermined value, and therefore by supplying reducing agent to the catalyst when it is judged that an accumulated amount of particulate matter on the filter has exceeded a predetermined amount and forced regeneration of the filter is required, the temperature of the exhaust gas at the turbine inlet rises and either the waste gate valve is opened or the boost pressure is lowered, thereby making it possible to regenerate the filter by effectively raising the temperature of the exhaust gas and combusting the particulate matter, ***without increasing the turbine work, because the hot exhaust gas is bypassed down to downstream of the turbine via the waste gate valve or the boost pressure adjusting mechanism.***

For theses reasons, the rejections of claims 10, 14 and 18 should be sustained.

b. Rejection of claims 10, 14 and 18 under 35 U.S.C. §103(a) over Saito in view of Kobayashi et al., JP-A-2003-278536, or Nagae, JP-A-2002-070536.

In response to appellant's arguments on pages 15-16, appellant asserts that as discussed in ***the present specification***, in an "internal combustion engine including a centrifugal supercharger, even when the temperature of the exhaust gas released from the internal combustion engine is increased, the energy of the exhaust gas is used for increasing a rotational speed of a turbine. Accordingly, **the temperature of the exhaust gas flowing from the NOx catalyst cannot be increased sufficiently**. Also, as the energy of the exhaust gas is used for increasing the rotational speed of the turbine and therefore the rotational speed of the turbine increases, a rotational speed of a compressor also increases and an amount of air taken in a cylinder increases. Accordingly, the intake air amount needs to be adjusted by decreasing an opening amount of an intake throttle valve. **As a result, "a pumping loss of the internal combustion engine increases, which causes deterioration of fuel efficiency."** ***Appellant's specification at page 2, line 28 - page 3, line 4***. Thus, the applied references fail to recognize a problem in the prior art. "In order to address this problem, a technology is proposed, in which a variable nozzle provided in the centrifugal supercharger or a wastegate valve is fully open such that the energy of the exhaust gas is prevented

from being used for increasing the rotational speed of the turbine." ***Appellant's specification at page 3, lines 5-8***. With this potential solution to the problems with the prior art, "an amount of energy of the exhaust gas which is used for increasing the rotational speed of the turbine, decreases. As a result, the intake air amount becomes smaller than that before the variable nozzle or wastegate valve is fully opened, which may cause an increase in amount of smoke." ***Appellant's specification at page 3, lines 12-15***. ***None of the applied references recognize this problem or propose a solution to the problem***.

The examiner respectfully disagrees since

First of all, appellant's arguments are based on the **Specification** of the present invention *(emphasis added).*

Secondly, it is noted that the features upon which appellant relies (i.e., **the temperature of the exhaust gas flowing from the NOx catalyst cannot be increased sufficiently; as a result, "a pumping loss of the internal combustion engine increases, which causes deterioration of fuel efficiency; *recognizing this problem or proposing a solution to the problem* etc…**) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Additionally, the combination of Saito with either Kobayashi et al., JP-A-2003-278536, or Nagae, JP-A-2002-070536 reads all the limitations as being claimed.

For theses reasons, the rejections of claims 10, 14 and 18 should be sustained.

c. Rejection of claims 13 and 17 under 35 U.S.C. §103(a) over Saito in view of either Kobayashi or Nagae, and Kawamoto, JP-A-2003-120353.

In response to appellant's arguments on pages 16-17, appellant argues that Kawamoto discloses "after-injection" being adjusted based on the boost pressure. However, Kawamoto fails to disclose the turbine rotation controller decreases the amount of energy of the exhaust gas.

The examiner respectfully disagrees.

Paragraphs [0026] and [0030] of Kawamoto discloses:

> [0026] ***Opening of the exhaust air bypass valve 16 is considered as full open, and the by-pass rate of turbine 5T is made to increase at*** step 4. Thereby, the temperature fall of the exhaust air which can control heat dissipation of exhaust air and is led to a catalyst to turbine 5T is controlled. It is referred to as post-injection-quantity Qp=0 at step 5. Post-injection of long duration is forbidden at the time of catalyst warming up, and fuel consumption aggravation and exhaust air performance degradation are controlled.
>
> [0030] At step 8, it judges whether ***the detected charge pressure Boost is less than [predetermined value B0]***, and in the case of below predetermined value B0, it is step 9, and it sets up the post-injection quantity 0P based on the map of drawing 5. Here, the post-injection quantity Qp is set as such a large value that charge pressure Boost is low. That is, by making [many] the post-injection quantity Qp and fully raising an exhaust-gas temperature, the enthalpy of a turbine inlet port can be enlarged, the exhaust air energy-recovery effectiveness in a turbine can be raised, the inhalation-of-air work of compression by the compressor can be made to be able to increase, and charge pressure can be promptly raised, so that charge pressure Boost is low. Here, when it has

> progressed from step 3, the predetermined value B0 may be set up according to a service condition (acceleration demand). That is, when Acc-A0 (or delta Acc-delta A0) is large, you may make it set up the predetermined value B0 greatly. Moreover, based on an inhalation air content, you may judge instead of charge pressure. Namely, it progresses to step 9 at the time of the inhalation air content Qac < desired value Qac0.

These Paragraphs means that as the bypass valve 16 is fully opened the amount of energy of the exhaust gas through the turbine will be decreases.

Accordingly, the rejections of claim 13 and 17 should be sustained

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Thai-Ba Trieu/
Primary Examiner
Art Unit 3748

TTB
February 27, 2011

Conferees:

/Robin O. Evans/

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